

REMARKS

Claims 1, 2, 7, 8 and 11-14 are pending in this application. By this Amendment, the Abstract is revised to be in single paragraph form, claim 1 is amended to include the limitations of prior claims 2 and 3, claim 2 is amended to be in independent form by including the subject matter of prior claims 1 and 4, claims 7 and 8 are amended to correct grammar, and new claims 11-14 are added.

No new matter is added by this Amendment. Support for the new claims 11-14 are supported in the original specification, for example at least by the original Figures (e.g., Figures 2(a) and 2(b)) and the accompanying description at the bottom of page 6 of the specification, illustrating and describing the two types of catalysts as being separate but present together in a mixed state in the combustion catalyst.

As an initial matter, Applicants note that the Office Action indicated that claims 1-11 were pending in the application. However, Applicants respectfully submit that the pending claims before this Amendment were claims 1-10.

I. Rejections Under 35 U.S.C. §102(b)

A. Relying Upon EP 1 004 347

Claims 1-10 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by EP 1 004 347 (hereinafter "EP 347"). This rejection is respectfully traversed.

As was correctly noted in the Office Action, EP 347 corresponds to U.S. Patent No. 6,677,264. Based upon the description set forth in the U.S. patent, EP 347 is believed to disclose a catalyst for purifying exhaust gases of a diesel engine. The catalyst contains two functional layers superposed together on top of an inert supporting body. The first functional layer, situated directly on the supporting body, has a nitrogen oxide storage function while the second functional layer, situated on top of the first functional layer, has a catalytic function and a hydrocarbon-storage function.

Applicants respectfully submit that EP 347 fails to teach or suggest the particulate matter composition catalyst of either claims 1 or 2. Specifically, EP 347 describes a catalyst for purifying exhaust gases in which two separate functional layers are superposed together upon the same inert supporting body. The particulate matter combustion catalyst of claims 1 and 2, however, requires that the NO oxidation catalyst and the NO₂ decomposition be carried upon separate carriers comprised of different materials. Nowhere does EP 347 teach or suggest a catalyst material in which these two distinct types of catalysts are carried upon different carriers.

For at least the foregoing reasons, Applicants respectfully submit that EP 347 fails to teach or suggest the presently claimed invention. Reconsideration and withdrawal of this rejection are respectfully requested.

B. Relying Upon EP 1 008 378

Claims 1-10 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by EP 1 008 378 (hereinafter "EP 378"). This rejection is respectfully traversed.

EP 378 describes an exhaust gas purifying catalyst comprising a honeycomb-shaped substrate 1 having a first catalytic layer 2 and an outer catalytic layer 3 thereon. The first catalytic layer 2 comprises a first noble metal such as platinum and an NO_x absorbing component such as barium, a powdered first support material made of, for example, a mixture of alumina and cerium oxide, and binder to form the first layer. The second catalytic layer 3 comprises a second noble metal such as platinum or rhodium, one of a potassium component and a sodium component, a powder second support material such as zeolite and an absorbing component for absorbing the potassium component or the sodium component, and binder for forming the second layer. See the Abstract and page 4, lines 4-27.

EP 378 fails to teach or suggest the particulate matter combustion catalyst of claims 1 or 2 of the present application. Regarding claims 1 and 2, EP 378 nowhere teaches or suggests an

NO oxidation catalyst comprising a catalyst component selected from the group consisting of platinum, gold, ruthenium, rhodium, iridium, palladium and mixtures thereof, carried on an acidic first carrier selected from the group consisting of silica, silica-alumina, zeolite with an $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio of 40 or greater, tungstic acid/zirconia, antimonic acid/alumina, and mixtures thereof, much less a particulate matter combustion catalyst that further includes an NO_2 decomposition catalyst as separately defined in each of claims 1 and 2.

Still further, Applicants note that a characteristic feature of the claimed invention is that the particulate matter catalyst includes both an NO oxidation catalyst and an NO_2 decomposition catalyst, and the catalyst effects of both the NO oxidation catalyst and an NO_2 decomposition catalyst are combined to promote oxidation of particulate matter contained in exhaust gases emitted from internal combustion engines such as diesel engines. By employing the catalyst of claims 1 and 2, a large amount of NO_2 is supplied from the NO oxidation catalyst, after which the NO_2 decomposition catalyst produces active oxygen from the NO_2 . The particulate matter catalyst thus allows for efficient supply of a large amount of active oxygen from the NO in exhaust gas so that the particulate matter can be oxidized at a high rate even at low temperatures below 300°C. EP 378 fails to teach or suggest a particulate matter catalyst including both an NO oxidation catalyst and an NO_2 decomposition catalyst as in claims 1 and 2, and fails to teach or suggest the foregoing benefits achieved by the presently claimed combustion catalyst.

Finally, regarding new claims 11-14, EP 378 also fails to teach or suggest an NO oxidation catalyst and an NO_2 decomposition catalyst present in a mixed state in a particulate matter combustion catalyst. EP 378 teaches that the catalyst comprises separate layers of catalyst materials that are each within a binder material, such that the catalyst materials are not present in a mixed state.

For at least the foregoing reasons, Applicants respectfully submit that EP 378 fails to teach or suggest the presently claimed invention. Reconsideration and withdrawal of this rejection are respectfully requested.

C. Relying Upon Suzuki et al.

Claims 1-3, 5 and 7-9 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,849,254 (Suzuki). This rejection is respectfully traversed.

First, regarding amended claim 2, this claim is amended to include the subject matter of prior claim 4, which prior claim 4 was not rejected relying upon Suzuki. Accordingly, this rejection is believed to now be moot with respect to amended claim 2.

Second, regarding amended claim 1, Applicants respectfully submit that Suzuki does not teach or suggest the recited particulate matter combustion catalyst or results associated therewith.

Suzuki describes an exhaust gas purifying catalyst comprising, in a segregated order from the upstream to the downstream of exhaust gas, a first catalyst 1 in which a noble metal catalyst is loaded on a porous acidic support, a second catalyst 2 in which at least one kind of metal selected from alkali metals, alkaline-earth metals and rare earth metals is loaded on a porous support, and a third catalyst in which a noble metal catalyst is loaded on a porous support. See the Abstract and Figs. 1 and 2. Suzuki further teaches an alternative embodiment in Fig. 3 in which separate catalyst components are formed as two different layers upon a honeycomb support. See the Abstract and col. 9, lines 10-20.

However, Suzuki nowhere teaches or suggest the use of an NO₂ decomposition catalyst as defined in present claim 1, i.e., an NO₂ decomposition catalyst comprising a catalyst component selected from the group consisting of the transition metals, carried on a second carrier selected from the group consisting of titania, zirconia, titania-zirconia, alumina, and mixtures thereof.

The second catalyst in Suzuki includes an NO_x absorber and is an NO_x adsorption catalyst, but is not an NO₂ decomposition catalyst. As described at column 3, lines 1-14 of Suzuki, NO_x is adsorbed in the second catalyst, but is released as NO_x under fuel-rich air-fuel ratios to flow into the third catalyst. Thus, the second catalyst of Suzuki is not an NO₂ decomposition catalyst as required in present claim 1.

Further, the combustion catalyst of claim 1 is a particulate matter combustion catalyst specifically designed to deal with particulate matter, and is able to efficiently effect combustion of such particulate matter at a high rate even at temperatures below 300°C. Nowhere does Suzuki teach or suggest a particulate matter combustion catalyst comprised of the combination of NO oxidation catalyst and NO₂ decomposition catalyst as recited in claim 1 and having such capabilities.

Finally, regarding claims 11-14, in all of the embodiments described in Suzuki, the catalyst components are described to be segregated, for example, in either separate parts of a support structure or as separate layers upon a support structure. Thus, Suzuki also fails to teach or suggest a catalyst comprised of two different catalyst materials present together in a mixed state.

For at least the foregoing reasons, Applicants respectfully submit that Suzuki fails to teach or suggest the presently claimed invention. Reconsideration and withdrawal of this rejection are respectfully requested.

D. Relying Upon EP 0 852 966

Claims 1, 3, 4, 7, 9 and 10 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by EP 0 852 966 (hereinafter EP 966). This rejection is respectfully traversed.

First, regarding amended claims 1 and 2, each of these claims is amended to include the subject matter of prior claim 2, which prior claim 2 was not rejected relying upon EP 966.

Accordingly, for this reason alone, this rejection is believed to now be moot with respect to the amended claims.

Second, EP 966 describes an exhaust gas purifying catalyst formed of a first powder comprising porous particles supporting rhodium and a second powder formed of porous particles supporting platinum and a nitrogen oxide adsorbing material. The second powder and the first powder are present in a mixed state. See the Abstract.

Applicants respectfully submit that EP 966 fails to teach or suggest the particulate matter combustion catalyst recited in claims 1 and 2. Specifically, EP 966 does not indicate that the catalyst is capable of dealing with particulate matter, for example, particulate matter emitted from a diesel engine. The presently claimed combustion catalyst is a particulate matter combustion catalyst specifically designed to deal with such particulate matter, and is able to efficiently effect combustion of such particulate matter at a high rate even at temperatures below 300°C. Nowhere does EP 966 teach or suggest a particulate matter combustion catalyst comprised of the combination of NO oxidation catalyst and NO₂ decomposition catalyst as recited in each of claims 1 and 2 and having such capabilities.

For at least the foregoing reasons, Applicants respectfully submit that EP 966 fails to teach or suggest the presently claimed invention. Reconsideration and withdrawal of this rejection are respectfully requested.

II. Rejections Under 35 U.S.C. §103(a)

A. EP 966 in view of EP 347

Claims 2, 5, 6 and 8 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over EP 966 in view of EP 347. This rejection is respectfully traversed.

EP 347 was relied upon by the Patent Office as allegedly suggesting the use of zeolite having a silica to alumina molar ratio of 40 or greater.

As was discussed above, EP 347 describes a catalyst for purifying exhaust gases in which two separate functional layers are superposed together upon the same inert supporting body. The particulate matter combustion catalyst of claims 1 and 2, however, requires that the NO oxidation catalyst and the NO₂ decomposition be carried upon separate carriers comprised of separate materials. Nowhere does EP 347 teach or suggest a catalyst material in which these two distinct types of catalysts are carried upon different carriers. In view of this, one of ordinary skill in the art would not have turned to the teachings of EP 347 for selection of any carriers for use in a very different catalyst system such as described in EP 966. The selection alleged by the Patent Office was clearly arrived at only through improper hindsight.

Further, Applicants respectfully submit that even if the teachings of these references were to have been combined in the manner alleged in the Office Action, the presently claimed invention still would not have been achieved. In particular, as was discussed above, neither EP 966 nor EP 347 teaches or suggests a particulate matter combustion catalyst that is comprised of the NO oxidation catalyst of the defined components in combination with the NO₂ decomposition catalyst of the defined components.

For at least the foregoing reasons, Applicants respectfully submit that nothing in either EP 966 or EP 347 would have led one of ordinary skill in the art to the presently claimed invention. Reconsideration and withdrawal of this rejection are respectfully requested.

B. EP 966

Claims 2, 5, 6 and 8 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over EP 966. This rejection is respectfully traversed.

In this rejection, the Patent Office alleged that it would have been obvious for one of ordinary skill in the art to have utilized silica or silica-alumina powders.

However, even if this reasoning of the Patent Office is accepted, the presently claimed invention still would not have been achieved. As noted extensively above, EP 966 fails to

teach or suggest the particulate matter combustion catalyst comprised of the NO oxidation catalyst of the defined components in combination with the NO₂ decomposition catalyst of the defined components. Nothing in the reasoning of the Patent Office remedies this significant deficiency of EP 966.

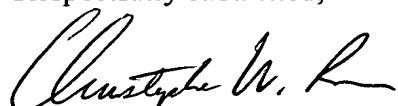
For at least the foregoing reasons, Applicants respectfully submit that EP 966 fails to teach or suggest the presently claimed invention. Reconsideration and withdrawal of this rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1, 2, 7, 8 and 11-14 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Christopher W. Brown
Registration No. 38,025

JAO:CWB/rav

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OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

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